

REPORTS on the MARINE BIOLOGY of the SUDANESE RED SEA.—XIV. On the CRUSTACEA ISOPODA and TANAIDACEA. By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Hon. Memb. New Zealand Institute, Hon. Fellow Worcester Coll., Oxford.

(PLATES 21–23.)

[Read 16th December, 1909.]

THE collection contains fifteen species, distributed over twelve genera. Two of the species, one as larval, the other as imperfect, are left unidentified. Of the remainder, four are regarded as new and present points of interest noted in the several accounts relating to them. Three of the four new species are based on specimens of very small size. In one case only a single specimen was available, and where the largest number was in hand, all three specimens were imperfect. Under these circumstances the collection may be regarded as having yielded a fairly creditable result, especially as it was made in a part of the world where investigators have been frequently at work.

Tribe *CHELIFERA*.

Family TANAIDÆ.

Genus TANAIS, *Audouin & Milne-Edwards*.

1828. *Tanais*, Audouin & Milne-Edwards, Précis d'Entomologie, p. 46, pl. 29, fig. 1.
 1905. *Tanais*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 2.
 1905. *Tanais*, H. Richardson, Bull. U.S. Nat. Mus. No. 54, p. 7.

TANAIS PHILETÆRUS, *Stebbing*.

1904. *Tanais philetærus*, Stebbing, Spolia Zeylanica, vol. ii. pt. 5, p. 7, pl. 2.

A female specimen, having the bilaminar and very prominent marsupium loaded with eggs, shows no characters that would justify its separation from the species named. The thumb of the first gnathopods is oval, instead of having an irregular inner margin, but the armature is similar to that of the male, the inner border being fringed with setæ, here six in number, and the apex carrying a short strong spine. The eyes and antennæ and three pairs of pleopods agree with those of the male. The uropods are four-jointed, and here the first or peduncular joint is a little longer than any one of the three subequal flagellar joints.

Length 2·5 mm.

Locality. Label: Crustacea, Quay wall, Dec. 04, Crossland coll.

Genus *LEPTOCHELIA*, Dana.

1849. *Leptochelia*, Dana, Amer. J. Sci. ser. 2, vol. viii. p. 425.

1900. *Leptochelia*, Stebbing, Willey's Zoological Results, pt. 5, p. 614.

1904. *Leptochelia*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 5.

Numerous references to the bibliography of this genus will be found under the last two dates.

LEPTOCHELIA MINUTA, Dana.

1853. *Leptochelia minuta*, Dana, U.S. Expl. Exp. vol. xiii. p. 800, pl. 53. figs. 5 a-d.

1900. *Leptochelia minuta*, Stebbing, Willey's Zoological Results, pt. 5, p. 615.

Four specimens of the male sex, in length about 2.5 mm., agree closely with Dana's figures. They are well distinguished from *L. mirabilis*, of Professor Herdman's expedition, not only by much inferior size, but also by the second joint of the upper antennæ, which is here barely twice, instead of eight times, as long as the third. The flagellum is eight-jointed. Along with these male specimens were several others, ranging from 2 mm. to 3.75 mm. in length, without the characteristic gnathopods of the adult male, and some of them declaring their sex by having eggs in the marsupium.

Locality. Label: 25/3/05: Crustacea lec., amg. *M. vulg.* shells.

LEPTOCHELIA LIFUENSIS, Stebbing.

1900. *Leptochelia lifuensis*, Willey's Zoological Results, pt. 5, p. 616, pl. 65 B, ♂, pl. 64 c, ♀.

A single specimen of the adult male with the characteristic first gnathopods occurred in the collection. The gnathopods in question are substantially constructed as well as elongate, with a wide gap left between the finger and the strongly bidentate thumb, when they meet. In this specimen the uropods have the longer ramus five-jointed, but the shorter one-jointed, not two-jointed as in the typical specimens.

Locality. Suez docks, among broken shells, 7/12/4. At a locality labelled 04/5, 11 Misc. 30, several specimens occurred which are probably the females or young males of this species. Some of these had the four pairs of marsupial plates well developed. A few also occurred along with *Tanais phileterus* above mentioned, and a single larval specimen of *Gnathia*.

Tribe *FLABELLIFERA*.Family *EURYDICIIDÆ*.Genus *CIOROLANA*, Leach.

1818. *Cirolana*, Leach, Dict. Sci. Nat. vol. xii. p. 347.

1905. *Cirolana*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 11.

For bibliography of the genus, see the last reference.

CIROLANA PARVA, *H. J. Hansen.*

1890. *Cirolana parva*, Hansen, Vid. Selsk. Skr. ser. 6, vol. iii. pp. 321, 340, pl. 2. figs. 6-6*b*, pl. 3. figs. 1-1*d*.
 1905. *Cirolana parva*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 12.
 1905. *Cirolana parva*, H. Richardson, Bull. U.S. Nat. Mus. No. 54, p. 111, figs. 93-95.

The specimen of this little species showed no distinctive sexual characters. In the first antennæ the flagellum is six-jointed, in the second thirteen-jointed. The apex of the telsonic segment is bordered with eight spines, not, indeed, on the outer case, which was almost denuded of its fringe, but on that prepared for the moult, which came away clear in dissection.

The length of the specimen was 4.5 mm., with a breadth of 1.25 mm.

Locality. Label: Crossland 04/5, 11 Misc. 30.

Family CORALLANIDÆ.

Genus LANOCIRA, *Hansen.*

1890. *Lanocira*, Hansen, Vid. Selsk. Skr. ser. 6, vol. v. pt. 3, pp. 287, etc.
 1904. *Lanocira*, Stebbing, in Gardiner's Fauna of the Maldives and Laccadive Archipelago, vol. ii. pt. 3, p. 706.
 1905. *Lanocira*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 19.

The four species of this genus already described are closely related one to the other, and the species now to be added is evidently a near ally of the rest. It belongs to the group in which the hinder part of the body is setigerous, and agrees with the form which I have named *L. gardineri* in having a frontal process to the head of the male. The process, however, is not horn-like, but distally expanded, so as to present a very distinct appearance.

LANOCIRA LATIFRONS, sp. n. (Plate 21.)

In the male the front of the head is produced into a broad, slightly upturned, somewhat axe-like process, of which the widened distal portion while *in situ* appears to be truncate in dorsal view, but is seen to have a curved outline when the head is detached. In the female there is only a broad shallow convex projection, in no way axe-like. Of the peræon segments, the first is the largest, the last three are successively smaller than those which precede them. The first pleon segment is almost completely concealed, and the fifth has its outer angles much overlapped by those of the preceding segment. The telsonic segment is broader at the base than the length, that part of it which no doubt represents the telson being triangular with a rather narrowly rounded apex. The surface is pretty closely set with

numerous spines or short setæ and its serrulate margin with long setæ, among which the apex exhibits traces of six spines; but both here and on the uropods the armature of spines and setæ, though evidently by nature ample, has suffered damage. The dorsal surface of the earlier pleon segments is microscopically squamose, but like the peræon exhibits at present very few spines.

The eyes are large and dark, have forty or more components, and are separated by an interval about equal to their shorter diameter.

The first antennæ have a seven-jointed flagellum; the second have one that is seventeen-jointed, fringed in the male with numerous long filaments. In essentials they do not differ from those described and figured for *L. gardineri*, yet between the two members of each pair there are small differences of detail, and, as is shown in the figures, a considerable difference in appearance may result from the positions which they assume when mounted. The second antenna on the left does justice to the filaments of the flagellum, while that on the right sets out the relative breadth of the various articulations but leaves the filaments in obscurity.

The upper lip is distally emarginate. The mandibles, as usual in this genus, were very untractable. There is a massive very irregularly quadrate base, with the rest of the trunk disproportionately slender, its distal edge bifid, with a sharp tooth above, but the lower details obscure (probably agreeing with what I have figured for the mandible of *L. zeylanica*). Near the distal tooth some minute reverted denticles appear on the upper margin. The palp is affixed to the strong basal part, and has the first joint rather shorter than the second, but as long as or longer than the third.

In this species, as in *L. zeylanica*, the first maxillæ present a very powerful and strongly curved apical spine, both this and the base on which it stands differing rather notably in shape and proportions from those figured by Hansen for his *Lanocira kröyeri*. The maxillipeds differ little from those of *L. zeylanica*, but the third and fourth joints are relatively rather longer, each being longer than broad, which is not the case in any of the species previously described.

The limbs of the peræon do not offer characters of marked distinction. The fifth peræopods are somewhat more slender than in *L. zeylanica*, with the apical spines of the joints less elongate than in the male of that species.

The branches of the second pleopods are considerably narrower in proportion to their breadth than in *L. zeylanica*.

Length of male 7.75 mm., breadth about 3.5 mm.; length of female 9 mm., breadth about 4 mm.

Locality. Label: Sudan Pearl Fisheries Investigations. Isopoda (2).

LANOCIRA ZEYLANICA, *Stebbing*.

1904. *Lanocira zeylanica*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 19, pl. 5 B.

The specimens which I identify with this species were labelled as taken, Sudan Trials 1 and 44 Sudan F. E.

Family CYMOTHOIDÆ.

Genus MEINERTIA, *Stebbing*.

1893. *Meinertia*, Stebbing, History of Crustacea, Internat. Sci. Ser. vol. lxxiv. p. 354.

MEINERTIA IMBRICATA (*J. C. Fabricius*).

1787. *Oniscus imbricatus*, Fabricius, Mantissa Insectorum, vol. i. p. 241.

1884. *Ceratothoa imbricata*, Miers, Zool. Coll. H.M.S. 'Alert,' p. 300.

1900. *Meinertia imbricata*, Stebbing, South African Crustacea, pt. 1, p. 58.

Three specimens of this well-known species, but of no exceptional sizes, were obtained by the Sudan expedition, under date 11.2.05.

Family SPHÆROMIDÆ.

1905. *Sphæromidæ*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 29.

1905. *Sphæromidæ*, H. Richardson, Bull. U.S. Nat. Mus. No. 54, p. 270.

1905. *Sphæromidæ* (subfam.), Hansen, Quarterly J. Microsc. Sci. vol. xlix. pt. 1, pp. 73, 100, 115.

It is worthy of notice that the three above-cited discussions of this rather perplexing family were contemporaneous and independent, a circumstance which may increase the student's confidence, at least, in those opinions which the three authors hold in common.

Genus SPHÆROMA, *Bosc*, 1802.SPHÆROMA CONGLOBATOR (*Pallas*).

1766. *Oniscus conglobator*, Pallas, Miscellanea Zoologica, p. 194, pl. 14. figs. 18, 19.

1787. *Oniscus serratus*, J. C. Fabricius, Mantissa Insectorum, p. 242.

1802. *Sphæroma cinerea*, Bosc, Hist. Nat. des Crustacés, vol. ii. p. 186, pl. 15. fig. 8.

Bosc accepts the species which Fabricius in 1793 named *Cymothoa serrata* and *Cymothoa assimilis* as synonyms of *Oniscus conglobator*, Pallas, and proceeds to give them a new name of his own devising. Fabricius himself regarded his *assimilis* as a synonym of the species which Pallas in 1772 had renamed *Oniscus globator*. It is obvious that in the eighteenth century

naturalists were as indifferent to rights of priority as some in our own day are inclined to be. It must be owned that Linnæus had set the example.

Bate and Westwood say of this species, "young individuals, measuring not more than two lines in length, have the outer edges of the side appendages of the tail (uropoda) entire, and not serrated." Specimens from Suez, measuring when unrolled only 2.5 and 3 mm. in length, had the outer edge of the outer branch of the uropods serrate as in their larger companions, the largest of which measured 7 mm. by 3.75 mm.

Locality. Suez docks, from two old broken shells, 7.12.04.

SPHÆROMA WALKERI, *Stebbing.*

1905. *Sphæroma walkeri*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 31, pl. 7.

Numerous specimens, mostly rather small, of this well-marked species were obtained at Suez by Mr. Crossland on board the s.s. 'Thyra.'

Genus EXOSPHEROMA, *Stebbing.*

1900. *Exospheroma*, Stebbing, Proc. Zool. Soc. London, p. 553.

1902. *Exospheroma*, Stebbing, South African Crustacea, pt. 2, p. 64.

1905. *Exospheroma*, Hansen, Quarterly J. Microsc. Sci. vol. xlix. pt. 1, pp. 75, 82, 103, 116, 118.

While transferring *Sphæroma leucura*, White, and *S. stimpsonii*, Heller, to *Exospheroma*, Hansen remarks further:—"Several of the nearly twenty species enumerated above as referred to *Sphæroma* by earlier authors, but whose systematic position I am unable to settle, will certainly prove themselves to belong to *Exospheroma*. On the other hand, of the three species established by Stebbing as species of *Exospheroma*, *E. validum* (Stebb.) is the immature male and *E. setulosum* (Stebb.) the female of the same species of *Cymodoce*, while *E. amplifrons* (Stebb.) is the adult male of an aberrant species of *Cymodoce*."

EXOSPHEROMA RETICULATUM, sp. n. (Plate 22, B.)

In comparing this species with the characters given by Hansen for the group which he designates Sphærominæ hemibranchiatae, and within that group with the characters distinguishing *Exospheroma*, there is only one point of obvious disagreement. Hansen states that the exopod of the third pleopods is two-jointed. But that is not the case with the present species.

All over the back the integument shows a fine net-like structure or pattern, with some scattered setules. The head has a small rostral point. The telsonic

segment is somewhat inflated except near the sinuous side margins and the narrowed blunt apex.

The eyes are wide apart. The first antennæ have the first joint, as usual, rather massive and suggestive of a composite nature, while the next joint, probably representing the true third, is as broad as it is long. The tapering flagellum consists of eight joints, the first of which is much the longest. In the second antennæ the fifth joint, though not elongate, is longer than any of the four preceding joints; of the ten joints composing the flagellum the first and last are very short.

The upper lip on each side of its rounded border shows a dark fringe of setules. In the mandibles the molar is prominent, the cutting-edge denticulate, with a secondary plate clear on the left mandible, but rather like a bifid spine on the right; the first joint of the palp is longer than either the second or the third, the latter two carrying spine-fringes. The lobes on the fourth, fifth, and sixth joints of the maxillipeds are well marked, but short.

The first gnathopod has on the long third joint a fringe of short setæ on the hind margin, not long and natatory such as are found in the genus *Sphaeroma*; on the projecting angle of its front margin there is a long spine, a similar one to which occurs on all the following limbs. These limbs are of the character usual in the genus, the longest being the fifth peræopods, between which ventrally are the pair of genital papillæ, these being, so far as my experience goes, of quite exceptional length. They are placed close together, taper each to a point, and appear to have finely crenulate margins.

The second pleopods of the male have the masculine appendage on the inner branch something like that figured by Whitelegge for his *Cerceis nasuta*, being of moderate length, comparatively broad, and quite smooth, but here the appendix is attached somewhat higher up on the branch and not straight but gently curved outwards.

The uropods in the adult male bear some resemblance to those which Haswell has figured for his *Sphaeroma brevis*, a species as to which further information is requisite. Here the outer movable branch is longer and much narrower than the round-ended fixed inner branch; it is serrulate and spinulose to a greater degree than the inner, and apically has a feebly bidentate appearance. In the smaller specimen, which is devoid of male characters, this outer branch of the uropods is not longer than the inner branch.

Length of adult male 3.5 mm., breadth 1.75 mm. Smaller specimen, sex undetermined, length 3 mm., breadth 1.5 mm.

Locality. Red Sea, 1904/5, Misc. 68.

The specific name refers to the reticulate or net-like appearance of the integument as seen under the microscope.

Genus CYMODOCE, *Leach*.

- 1813-14. *Cymodoce*, Leach, Edinb. Encycl. vol. vii. p. 433.
 1818. *Cymodocea*, Leach, Dict. Sci. Naturelles, vol. xii. pp. 341, 342.
 1840. *Cymodocea*, Milne-Edwards, Hist. Nat. Crust. vol. iii. p. 212.
 1902. *Cymodoce*, Stebbing, South African Crust. pt. 2, p. 73.
 1905. *Cymodoce*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 42.
 1905. *Cymodoce*, Hansen, Quarterly J. Microsc. Sci. vol. xlix. pt. 1, pp. 70, etc.
 1906. *Cymodoce*, H. Richardson, Proc. U.S. Nat. Mus. vol. xxxi. p. 5.

As will be seen from Hansen's above-mentioned essay, several species, properly belonging to this genus, have previously been described under other generic names.

CYMODOCE PILOSA (*Milne-Edwards*).

1840. *Cymodocea pilosa*, Milne-Edwards, Hist. Nat. Crust. vol. iii. p. 213.
 1905. *Cymodoce pilosa*, Hansen, Quarterly J. Microsc. Sci. vol. xlix. pt. 1, pp. 83, 134, pl. 7. figs. 1 a-2 e.

In the Ceylon report I have given a translation of the description of this species by Milne-Edwards, for comparison with my own accounts of the nearly allied *Cymodoce bicarinata*. The specimens from Suez which I now venture to name *C. pilosa* agree well with the original description, except that (like the male of *C. bicarinata*) they are only half the size, which may possibly be accounted for in some by their being females, but in addition they do not show the setose boss at the extremity of the median longitudinal furrow of the telsonic segment, and further the outer ramus of the uropods is not much, if at all, broader than the inner. Milne-Edwards says that these rami extend much beyond the extremity of the pleon. In the present specimens, when the pleon is folded, these rami appear to extend beyond it, but that is no longer or not always the case when it is flattened out.

The specimen first dissected proved to be a female laden with large eggs which extended from the head to the pleon. The antennæ are of the usual pattern. In the first pair the first joint is broad and long with a rounded boss at the base and a flattened lamina extending along and much beyond the boss, the two together probably representing the first and second joints in coalescence. The following joint is short and less broad, but still laminar, carrying a slender fifteen-jointed flagellum, in which the first joint is so much longer than any of the rest that it might well pass as peduncular. In the second antennæ the first three joints are rather short, not massive, the fifth joint rather longer than the fourth, which is not greatly longer than the second; the flagellum eleven-jointed. This flagellum in another specimen, with fewer eggs, was fifteen-jointed like that of the first pair.

In the mouth-organs both specimens agree closely with the account and figures given by Hansen, who for the first time has pointed out that in

some genera of this family the mouth-parts in ovigerous females are metamorphosed in a very peculiar way. In the egg-bearing females of *C. pilosa* he states that the incisive process or cutting-edge is rounded and yellowish, which shows that it is less hard than in the male, that the secondary plate has disappeared, while the molar process is very low, scarcely developed, and without equipment for trituration. The female first maxillæ, he says, have been altered in a corresponding way; the distal half of the inner lobe is much narrower than in the male, "its end rounded and the stiff setæ lost; the outer lobe has gained a number of fine hairs, but its end is rounded and of the strong terminal spines at most a rudiment and generally nothing remains." The lobes of the second maxillæ have lost all their numerous setæ found in the male and in immature specimens, and the bifid outer lobe has been shortened. "Besides, all these mouth-parts have the muscles considerably or much reduced; but the muscles to the mandibular palps, still shaped as in the males, have been preserved." The lower lip has been much reduced, being only about half as large as in the male. "The maxillipeds are still more interesting; in the female with brood . . . the four distal joints have been reduced in size, especially the lobes are much shorter and have lost all the setæ found in other specimens . . . ; the lobe from second joint has lost its distal setæ, but the two proximal joints with the epipod are, on the contrary, expanded to such a degree that their joint surface is between twice and three times larger than in the male of the same size; some of the muscles of the palp have been reduced in size and all are lighter in aspect, while the musculature moving the expanded proximal portion is well developed." Later on Hansen makes it clear that exact similarity among specimens with metamorphosed mouth-parts need not be expected. He says: "Of ten females with marsupium of *Cymodoce pilosa* (M.-Edw.) eight had all their mouth-parts altered as described above, but in two specimens the curious feature was observed that the maxillipeds and [second] maxillæ had been completely metamorphosed, while the alterations in the two anterior pairs of appendages were less complete. In one of these specimens the end of the mandibles had kept their dark colour and the outer lobe of both maxillulæ [first maxillæ] their spines, while lacinia mobilis [accessory plate of mandibles], etc., had disappeared; in the other specimen only a little of the dark colour on the end of the mandibles and the spines on one of the maxillulæ were preserved."

In both the Suez specimens examined the mandibles are dark, and in both the lobe from the second joint of the maxillipeds shows little spine-teeth or spinules on the inner part of the distal border. In at least one instance there are two simple spines on the narrowed apex of the outer plate of the first maxillæ. In all cases the palp of the mandibles retains the setose armature of the second and third joints, each of which is shorter than the first.

In the Ceylon report I have figured a species under the name *Cilicæa* (?),

sp. juv., and say that "The small specimen figured is no doubt immature, as may be judged from the unfurnished condition of the maxillipeds." Under the new light thrown on the subject by Dr. Hansen, it is more probable that the specimen referred to was a female.

Length, approximately the same for the four female specimens, 6.75 mm.; one 6 mm. long, probably an immature male, with the mouth-organs quite normal for that sex, but without appendix on second pleopods.

Locality. From two old broken shells, Suez docks, 7.12.04.

Tribe *ASELLOTA*.

Family *JERIDÆ*.

1897. *Ianiridæ*, Sars, Crustacea of Norway, vol. ii. pt. 5, p. 98.

1905. *Janiridæ*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 48.

1905. *Parasellidæ*, Hansen, Proc. Zool. Soc. London, 1904, vol. ii. p. 315.

1905. *Janiridæ*, H. Richardson, Bull. U.S. Nat. Mus. No. 54, p. 448.

In 1897 Sars divided his tribe Asellota into the five families, Asellidæ, Ianiridæ, Munnidæ, Desmosomidæ, and Munnopsidæ. In 1905 Hansen accepted the Asellidæ for the genera *Asellus*, Geoffroy, *Mancasellus*, Harzer, and *Cacidothea*, Packard; he established a new family Stenetriidæ for *Stenetrium*, Haswell, and grouped the other families together under the name Parasellidæ. Without here offering any opinion one way or the other on this grouping, I may observe that as *Jera*, Leach, is the oldest genus, it may claim to contribute its name to the formation of the family title. In Leach's article "Crustaceology," in the 'Edinburgh Encyclopædia,' vol. vii. 1813-14, at page 434, he gives *Jera* as twelfth, and *Janira* as thirteenth genus in tribes which we now recognize as Isopods.

As continental writers often appear to consider such forms as *Jera*, *Iera*, *Janira*, *Ianira*, *Janthe*, *Ianthe* as respectively equivalents, it may be worth while to note that in each case for English readers the substitution of the second form, beginning with a vowel instead of a consonant, adds a syllable to the name, so that such a form as *Ianthe* is substantially distinct from *Janthe*.

Genus *JANIRA*, Leach.

1813-14. *Janira*, Leach, Edinb. Enycl. vol. vii. p. 434.

1905. *Janira*, Stebbing, in Herdman, Ceylon Pearl Fish., Suppl. Rep. 23, p. 49.

1905. *Ianira*, Hansen, Proc. Zool. Soc. London, 1904, vol. ii. pp. 302, etc.

1905. *Janira*, H. Richardson, Bull. U.S. Nat. Mus. No. 54, pp. 449, 468.

Under the above references the synonymy and characters of this genus will be found fully and instructively discussed. There is, however, one

small point which seems to offer a problem hitherto unconsidered. If the first gnathopods of the male in Hansen's *Stenetrium antillense* and in the new species of *Janira* here described are compared, the illustrative drawings show a remarkable similarity of the distal joints. But these joints, forming in each case the subchela or grasping arrangement, are reckoned as hand and finger in the *Stenetrium*, but as wrist, hand, and finger in the *Janira*. In other words, the dilated joint is preceded by five others in the former case, but by only four in the latter. The result is that in the *Stenetrium* the gnathopod has for its seventh joint a large normally claw-like finger ending in a minute nail, but in the *Janira* the minute nail is supposed to be the finger, and the claw-like joint is regarded as the sixth joint or hand. Now, in the Asellidæ the fifth joint or wrist of the first gnathopod is reduced to very small proportions, and it becomes a question whether in *Janira* the process may have been carried further, and the fifth joint either have been squeezed out altogether or have become undistinguishably coalesced with the sixth joint. While I think this not improbable, it is right to point out that in *Janira minuta*, Richardson, and in *Janira nana*, Stebbing, as well as in *Janira maculosa*, Leach, the supposed finger is not quite so insignificant as in the two species above compared, but has a shape and armature similar to that of the undoubted fingers in the following limbs.

JANIRA CROSSLANDI, sp. n. (Plate 22, A.)

Though the collection contained three specimens, two males and a female, the uropods were missing from all, nor was a clear view obtained of the frontal outline of the head. The pleon, about as broad as long, has the margins very faintly serrulate.

The slightly prominent eyes are about twice as long as wide, with the inner margin concave.

The first antennæ have the first joint longer than broad, as long as the two following joints combined, the whole peduncle being two-thirds as long as the eight-jointed flagellum, in which the first and third are notably shorter than the joints which respectively follow them. The second antennæ have the first four joints as usual short, with a very small exopod on the third joint, about twice as long as broad, and tipped with two setules; the fifth and sixth joints are subequal, each a little longer than the first four joints combined; the flagellum, somewhat longer than the peduncle, was composed of fifty-four very short joints, this and the last two joints of the peduncle being present only on the left side of the smaller male specimen; so easily detachable is this part, that after examination it was lost in the anxious endeavour to keep it safe.

The mouth-organs appear to agree closely with those figured by Sars for *Janira maculosa*, Leach. The mandibles are contented with four spines in the spine-row. The narrow inner plate of the second maxillæ is tipped with

four small setæ, of which the innermost is the longest. In the maxillipeds the large second joints are united by two pairs of coupling spines.

The first gnathopods were present only in the larger male specimen. Their most characteristic feature is the large fifth joint, of which the homology has been considered above. It is nearly twice as long as broad, with the hind margin produced into a triangular tooth; near to the hinge of the following joint a second, somewhat similar, tooth projects still further. Over this bidentate palm and considerably overlapping it the narrow so-called hand extends finger-like, rather abruptly crooked at the base and then gently convex on the outer and a little sinuous on the inner margin, the latter more closely setulose than the former; from the outer end of the shortly truncate apex projects a minute blunt finger or nail, tipped with setules.

The remaining limbs, with slight variations of length, are all nearly alike, having a rather long slender sixth joint, followed by a short finger, with a curved nail at apex of the inner margin and a smaller, movable, curved spine at the apex of the outer margin. Hansen (*loc. cit.* p. 304) regards the outer spine as the nail.

The first pleopods of the male differ a little from those which have been figured for other species, the apices being simple instead of bilobed. The second pair differ from those figured by Sars in having the large outer part more squared below; whether the little part described by Hansen as exopod was one- or two-jointed could not be discerned; the masculine appendix or endopod is acutely produced. The respiratory endopod of the third pair probably carries three plumose setæ on the lower margin, as observed on a detached ramus, though absent from those figured.

Length of larger male 2.25 mm., of the smaller 1.75 mm.

Localities. The males taken "25/3/05. Crustacea &c. amg. *M. vulg.* shells," along with *Leptochelia minuta*.

The female specimen, about the same size as the larger male, labelled "04/5.11, Misc. 30."

The specific name is given in compliment to Mr. Crossland, by whom this and many other interesting species were obtained.

Isopoda terrestria.

Tribe ONISCIDEA.

Family TYLIDÆ.

1840. "*Tylosiens*," Milne-Edwards, Hist. Nat. Crustacés, vol. iii. p. 186.
 1853. *Tylinæ*, Dana, U.S. Expl. Exp. vol. xiii. pp. 715, 717.
 1877. *Tylosinæ*, Miers, Proc. Zool. Soc. London, p. 674.
 1885. *Tylides*, Budde-Lund, Isopoda terrestria, p. 272.
 1893. *Tylidæ*, Stebbing, Hist. Crustacea, Internat. Sci. Ser. vol. lxxiv. p. 423.

Genus TYLOS, *Audouin*.

- 1825? *Tylos*, Audouin, Explic. planches Crust. Égypte, p. 287.
 1825. *Tylos*, Latreille, Fam. Nat. Règne Animal, p. 567 (*nomen nudum*).
 1829. *Tylos*, Latreille, Règne Animal, vol. iv. p. 141.
 1831. *Tylos*, Latreille, Cours d'Entomologie, p. 413.
 1836-40. *Tylos*, Guérin-Méneville, Iconographie Règne Animal, pl. 31, p. 35
 1840. *Tylos*, Milne-Edwards, Hist. Nat. Crustacés, vol. iii. p. 186.
 1843. *Tylos*, Krauss, Sudafrik. Crust. p. 63.
 1853. *Tylos*, Dana, U.S. Expl. Exp. vol. xiii. p. 715.
 1885. *Tylos*, Budde-Lund, Isopoda terrestria, p. 272.
 1893. *Tylos*, Stebbing, Hist. Crustacea, p. 423.
 1896. *Tylos*, Dollfus, Mém. Soc. Zool. France, vol. ix. p. 550.
 1909. *Tylos*, Holmes and Gay, Pr. U.S. Mus. vol. xxxvi. p. 376.

Several other references are procurable by consultation of the above-given list. Guérin dates his plate 31 December, 1836, but in the description, having in the meantime become Guérin-Méneville, he gives a reference to observations made by Milne-Edwards on the respiratory organs of *Tylos* in the "journal l'Institut, n. 280, p. 152, 9 mai, 1839." Notwithstanding the numerous notices and several excellent figures which we have in relation to this remarkable genus, in one or two respects the details of its structure seem still to be rather obscure. All the species seem to be very closely akin one to the other, there being nothing apparently to justify the opinion of Krauss that the two species which he distinguished at the Cape of Good Hope might perhaps require to be placed in a separate genus. There is, indeed, a vast disparity in size between his *T. granulatus*, which is said to reach a length of two inches with a breadth of one inch (50 × 25 mm.), and the *T. albidus*, Budde-Lund, 7·8 mm. by 2·7-3 mm., from the Nicobar Islands, but dimensions of themselves are not sufficient for generic distinction, even apart from the gradations of size furnished by other species in this genus.

As there is only one genus at present recognised in the family, Budde-Lund does not separate their characters. Among these he gives, appendages of the pleon five pairs; first pleopods wanting; appendages of the four following segments having only one ramus apiece, all branchial; ramus of the first segment, however, even in the male, within produced into a long compressed penis; appendages of the sixth segment forming an open column below, with a very small outer ramus at the apex. It will be noticed that here Budde-Lund, after saying "*pedes primi paris desunt*," remarks, "*ramus annuli primi tamen etiam in mare intus in penem longum, compressum productus*," implying that at least in the male the appendages of the first pleon segment are not wanting. In this latter view he agrees with Milne-Edwards, who solved the difficulty of finding only four pairs of pleopods, not by saying that the first pair were wanting, but that the fifth pair were rudimentary. In his Atlas to the 'Règne Animal,' pl. 73 bis,

fig. 2 *d*, he represents the masculine appendix in connexion with a branchial plate, and describes the figure as "L'une des fausses pattes branchiales de la première paire." Von Ebner in 1868, when describing his genus *Helleria*, and comparing it with *Tylos*, made it clear, I think, that the masculine appendix in both genera belonged to the second pleopods, the missing pair being the first. The same author states, I think, correctly that the pleopods here, as elsewhere, are double-branched. As he expresses it, "they carry as well the branchial operculum as the branchial sack." The two, however, are here closely superposed. The uropods are bilaminar, the outer, that is, the ventral opercular leaf, having apically a small semi-oval setiferous branch, regarded as the exopod. Closely applied to the opercular leaf is another, which is distinct from it, at least on the upper and lower borders, reaching about level with it at the narrowed setulose apex, but not reaching its top with its strongly rounded upper border.

The species which I now propose to add to the genus is distinguished not only by its very small size but by its relative narrowness, suggestive rather of the genus *Stenoniscus*, Dollfus, than of *Tylos*. The maxillipeds are six-jointed, having the palp, therefore, three-jointed instead of two-jointed, as given by Budde-Lund in the family character. Young ones, of the same length, of *Tylos latreillii*, Audouin, brought to me from Formiæ by the late E. Mello Saunders, Esq., are globose, half as broad as long, and in two of them that were dissected no trace appeared of the male appendix. The solitary specimen in Mr. Crossland's collection accordingly seems to represent a new species, in proximity to *T. albidus*, Budde-Lund.

TYLOS EXIGUUS, sp. n. (Plate 23.)

The small size of the specimen leaves it open to the suspicion that it may be the young of some species already known. Against this explanation may be set the development of the second pleopods with male characteristics, and the general shape, which is not a full oval as usual in the genus, but of such narrowness as to make perfect globation not very feasible. As will be seen from the figures, the other details agree closely with the corresponding parts of *T. latreillii*.

It belongs to the group of species in which the scutellum, surmounting the epistome, is conspicuously triangular, not as in *T. granulatus*, Krauss, quadrate with rounded upper margin. In the last-mentioned species the triangular apex is bent so as to be quite inconspicuous.

The second antennæ have the fifth joint of the peduncle scarcely as long as the flagellum, of which the first two joints are equal in length, each considerably longer than the tapering third joint. In *T. albidus* the third joint is described as the longest.

The mandibles show five or six plumose setæ, two separate groups between the cutting-edges and the molar, and a large one by itself on the further side

of the molar. The three joints of the maxilliped palps have been already mentioned. Their boundary-lines are rather faint.

The ventral plates of the fifth pleon segment are of moderate size, slightly curved, with the free end truncate.

The colour of the preserved specimen pallid, with black dots not thickly strewn.

Length 4.5 mm., breadth scarcely 1.5 mm.

Locality. Red Sea, 1904-5. Misc. 68.

An imperfect specimen of one of the more ordinary forms of Oniscidea and some Talitridæ occurred in the same glass tube with this *Tylos*.

EXPLANATION OF THE PLATES.

PLATE 21.

Lanocira latifrons, sp. n.

n.s. ♂. Natural size of the male specimen represented in the adjacent figure.

n.s. ♀. Natural size of the female specimen, of which the head only is shown.

C. ♂, *C.* ♀. Dorsal view of head, respectively of the male and female.

a.s., *a.i.*, *a.i.*. First and second antennæ, with the abnormal apex of one of the lower pair further magnified.

l.s., *m.*, *m.v.* 1, *m.xp.* Upper lip, a mandible (probably not quite perfect), one of the first maxillæ in two opposite aspects, the maxillipeds.

gn. 1, *gn.* 2, *pp.* 5. First and second gnathopods, and fifth peræopod.

plp. 2. Second pleopod, with further enlargement of the masculine appendix.

Pl. Dorsal view of the pleon, with the uropods.

The mouth-organs, the gnathopods, the fifth peræopods, and the two further enlargements are on a uniform scale, higher than that of the other details.

PLATE 22 (A).

Janira crosslandi, sp. n.

n.s. Line indicating natural size of the male specimen figured below, head, peræon, and pleon, separated; the upper lip protrudes in front of the head, of which the frontal line could not be clearly ascertained. The limbs of the slightly flattened peræon are shown on the right side, and the distal part of the first gnathopod and seventh joint of the second peræopod are further magnified.

oc. One of the eyes.

a.s., *a.i.* First antenna and proximal joints of second antenna.

l.s., *li.* Upper and lower lips.

m., *m.v.* 1, *m.v.* 2, *m.xp.* Mandible, first and second maxillæ, and maxillipeds.

plp. 1, 2, 3. First, second, and third pleopods of male.

The eye, basal joints of second antenna, first maxilla, and third pleopod are separately drawn from the specimen figured under *n.s.*; the other mouth-organs and pleopods and the first antenna from another, smaller, male specimen.

PLATE 22 (B).

Exospheroma reticulatum, sp. n.

n.s., *n.s.* ♂. Line to the left indicating natural size of specimen represented in dorsal view; line to the right indicating natural size of a male specimen from which the details were figured.

Pl. ♂. Pleon and uropods of male.

a.s., *a.i.* First and second antennæ.

l.s., *l.i.*, *m.*, *m.*, *mx. 1.*, *mx. 2.*, *mxp.* Upper and lower lips, mandibles, first and second maxillæ, and maxillipeds.

gn. 1., *prp. 5.* First gnathopod and last five joints of fifth peræopod.

plps. The first and second pleopods seen from the underside, along with the genital papillæ of the seventh peræon segment. On the left the first pleopods are indicated without setæ, and the second pair are detached.

All the details, except the pleon and uropods, are drawn to a uniform scale.

PLATE 23.

Tylos exiguus, sp. n.

n.s. Lines indicating natural size of specimen figured below.

Pl. Dorsal view of pleon.

v.l. Ventral lamina of fifth pleon segment.

a.i. Second antenna.

l.s. Upper lip, with epistome and scutellum.

m., *m.* The mandibles.

l.i. Lower lip.

g. The stomach.

mx. 1., *mx. 2.*, *mxp.* First and second maxillæ and maxillipeds.

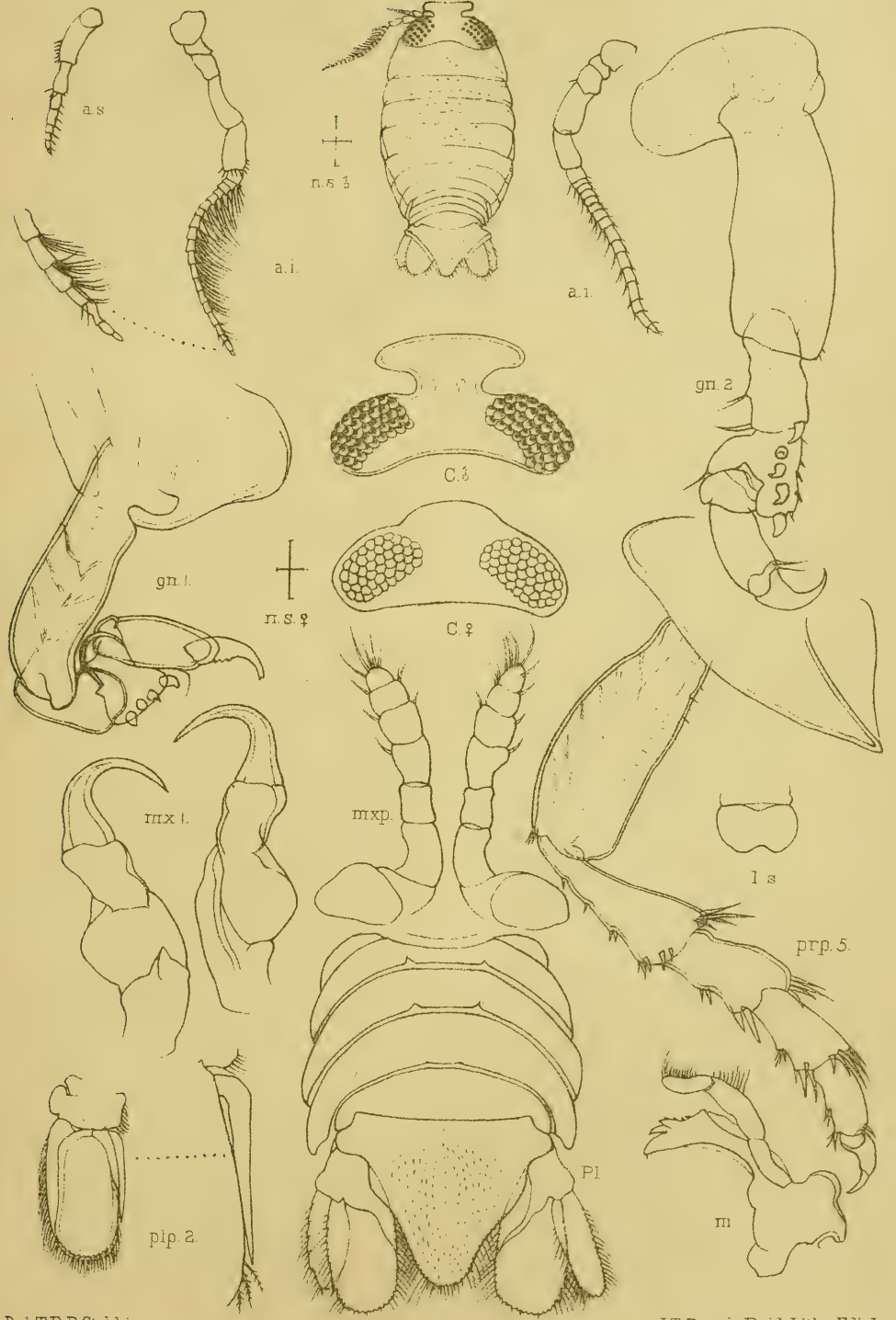
gn. 1., *prp. 5.* First gnathopod and fifth peræopod.

plp. Second pleopod.

urp., *urp.* The uropods, one on the right from the ventral side, that on the left from the upper side.

Stebbing

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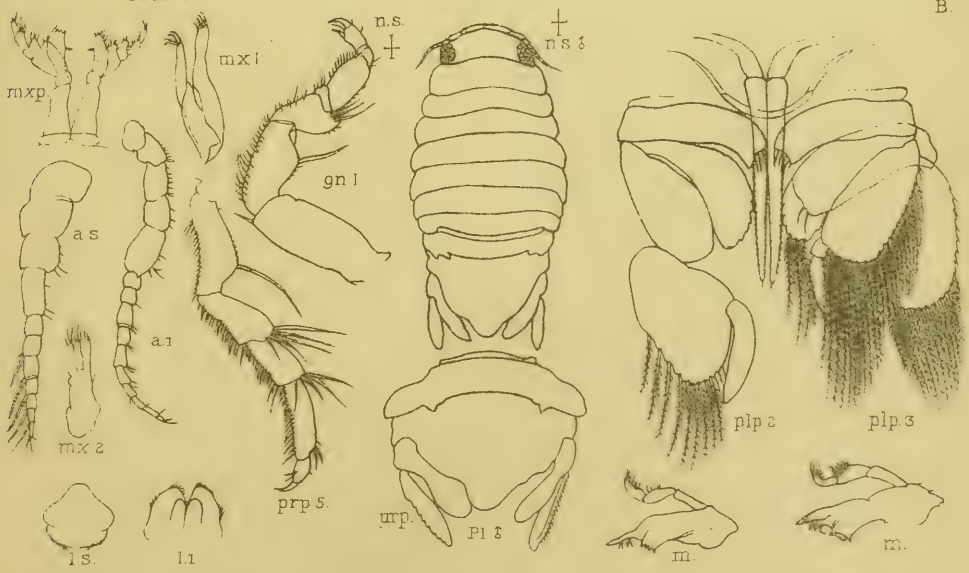
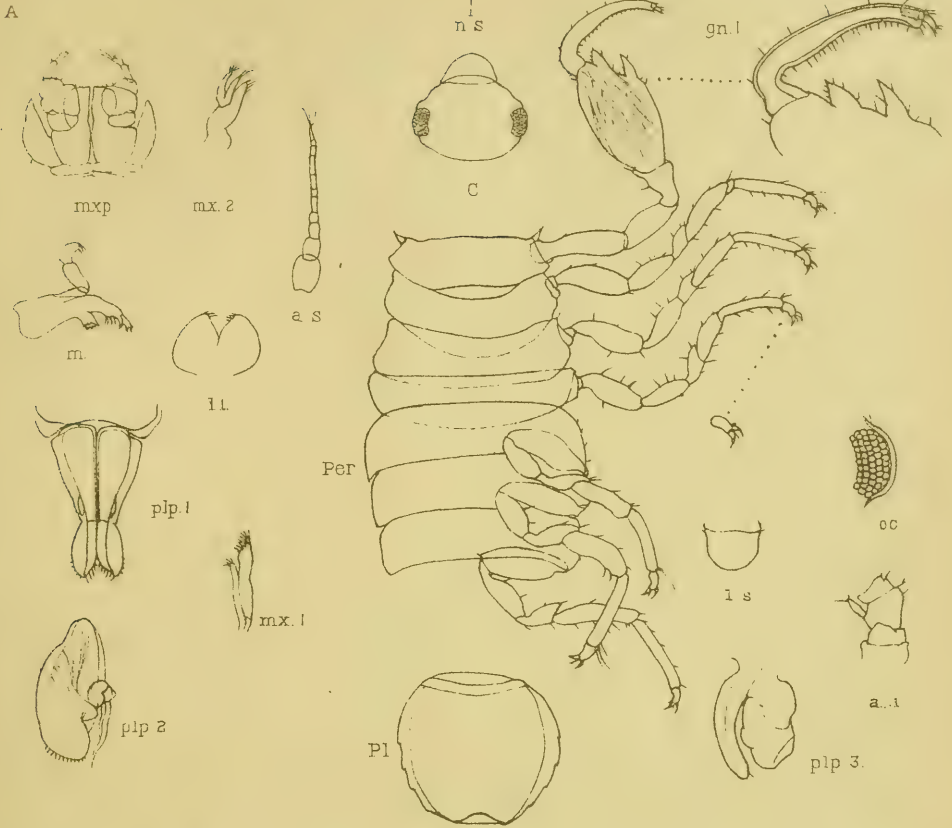
Del. T.R.R. Stebbing

J.T. Rennie Reid. Litho. Edin.

LANOCIRA LATIFRONS, n. sp

Stebbing.

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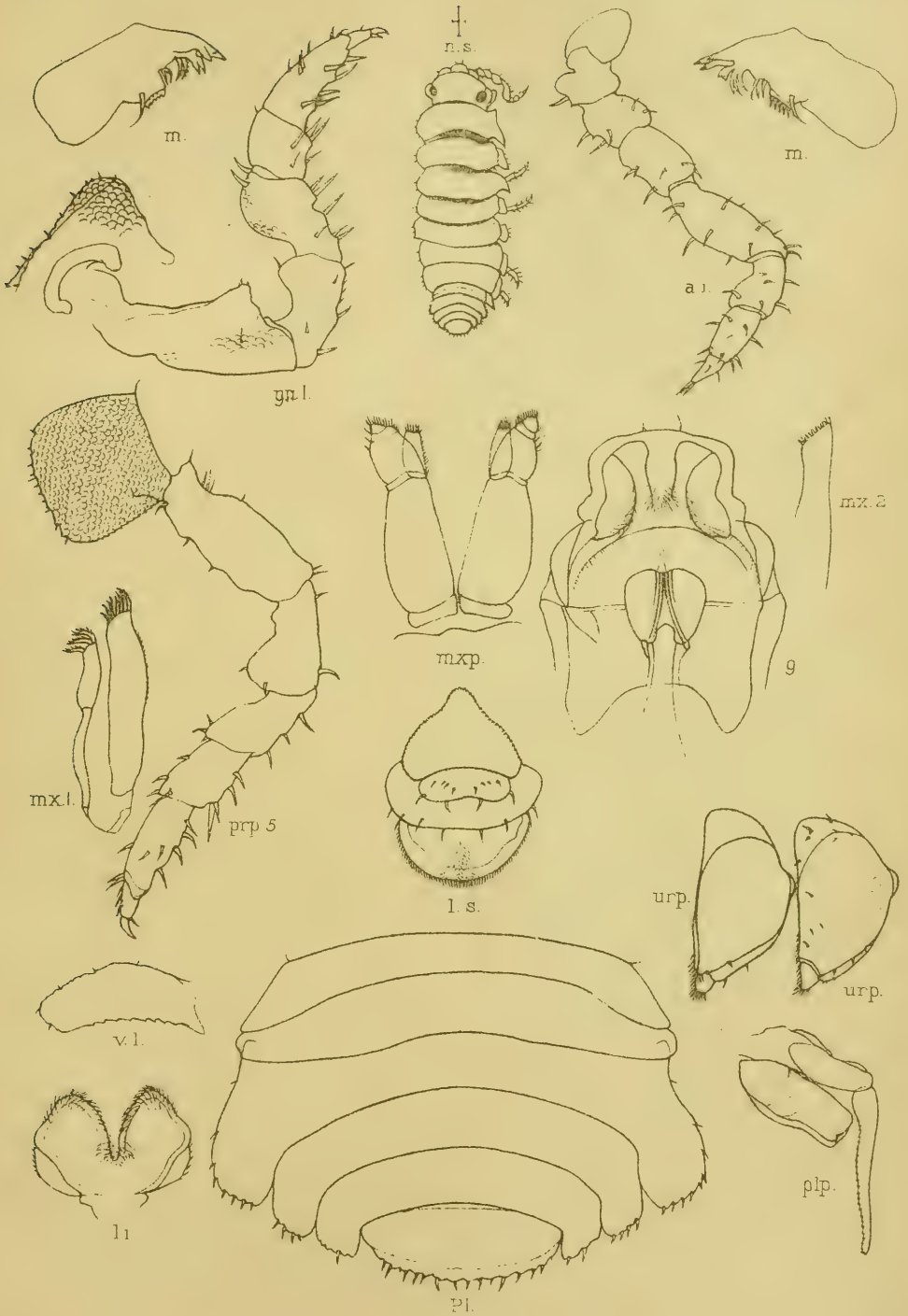


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J. T. Rennie Reid, Litho. Edin^f

A. JANIRA CROSSLANDI, n. sp.

B. EXOSPHAEROMA RETICULATUM, n. sp.



Del. T. R. Stebbing.

J. T. Rennie Reid, Litho. Edinb.

TYLOS EXIGUUS, n. sp.